

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G01N 27/00, 33/00		A1	(11) International Publication Number: WO 00/07001 (43) International Publication Date: 10 February 2000 (10.02.00)
(21) International Application Number: PCT/US99/17422		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 30 July 1999 (30.07.99)			
(30) Priority Data: 60/094,721 30 July 1998 (30.07.98) US 60/123,819 11 March 1999 (11.03.99) US			
(71) Applicant (for all designated States except US): PURDUE RESEARCH FOUNDATION [US/US]; Office of Technology Transfer, 1063 Hovde Hall, West Lafayette, IN 47907 (US).			
(72) Inventors; and			
(75) Inventors/Applicants (for US only): MANSOUR, Said [US/US]; 2818 Cambridge Street, West Lafayette, IN 47906 (US). BRAZIER, Mark [US/US]; 3037 Courthouse Dr. #1, West Lafayette, IN 47906 (US). MCELFRESH, Michael [US/US]; 931 Princess Drive, West Lafayette, IN 47906 (US).			
(74) Agents: PAYNTER, L., Scott et al.; Woodard, Emhardt, Naughton, Moriarty & McNett, Bank One Center/Tower, Suite 3700, 111 Monument Circle, Indianapolis, IN 46204 (US).			

(54) Title: LOW TEMPERATURE OXYGEN GAS SENSOR

(57) Abstract

A highly sensitive oxygen gas sensor (60), which operates at ambient and sub-ambient temperatures was developed using nonstoichiometric metal oxides such as ferroelectric PZT materials or yttria stabilized zirconia. The sensor is constructed of a solid state electrolyte thin film (62) of the nonstoichiometric metal oxide material sandwiched between two metal electrodes (64, 68). An

offset d.c. voltage, which is manifested as a translation of the ferroelectric hysteresis loop, develops between the two electrodes (64, 68) when an electric field is applied. The magnitude and direction of the offset voltage depends on variations in oxygen concentration or partial pressure at one of the device electrodes.

